SOV/137-58-8-17380

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 170 (USSR)

AUTHOR: Tikhomirov, V.I.

TITLE: On the Theory of the Rate of Oxidation of Iron and Iron Alloys at Elevated Temperature. 3. Oxidation of Iron Alloys (K teorii skorosti okisleniya zheleza i zheleznykh splavov pri vysokoy temperature. 3. Okisleniye splavov zheleza)

PERIODICAL: Uch. zap. LGU, 1957, Nr 227, pp 192-239

ABSTRACT: The theoretical examination of the processes of scale formation on iron-base alloys is presented. It is found that in a number of cases the laws governing the oxidation process obtained for pure metals can be referred to binary alloys. The equation was drawn which coordinates the rates of oxidation of two binary alloys of a like type. The analysis of experimental data, found in literature, on the rate of oxydation of Fe-Cr, Fe-Ni, and Fe-Si alloys indicates that they agree well with the theoretical conclusions. Bibliography: 28 references. For Part 2, ref. RZhMet, 1956, Nr 10 abstract 11188.

1. Iron--Oxidation 2. Iron alloys--Oxidation R.L.

Card 1/1

VASIL'YEV, Vladimir Vissarionovich; YEFREMOV, German Vasil'yevich; TIKHOMIROV, Vladimir Ivanovich; MORACHEVSKIY, Yu.V., prof., otv.red.; SHCHEMELEVA, Ye.V., red.; SEMENOVA, A.V., tekhn.red.

[Short course in analytical chemistry for biology students] Kratkii kurs analiticheskoi khimii dlia biologov. Izd-vo Leningr. univ., 1958. 296 p. (MIRA 12:2)
(Chemistry, Analytical)

IPAT'YEV, V.V.; TIKHOMIROV, V.I.; SOBOLEVA, N.F.

Rate of absorption of hydrogen sulfide by solutions of arsenic trioxide and sodium carbonate. Zhur. prikl. khim. 31 no.10:1472-1477 O '58. (MIRA 12:1)

1. Leningradskiy Nauchno-issledovatel'skiy institut po pererabotke nefti i polucheniyu iskusstvennogo zhidkogo topliva.
(Hydrogen sulfide) (Absorption)

TIKHOMIROV, Vladimir Ivanovich for Doc Chem Sci on the basis of dissertation defended 21 May 59 in Council of Len Order of Lenin State Univ im Zhdanov, entitled "Formation of scale on iron and iron alloys under high temperatures." (BMViSSO USSR, 1-61, 26)

TIKHOMIROV, V.I., doktor khim. nauk, otv. red.; PIASTRO, V.D., red.;

[Methods for the quantitative determination of elements] Metody kolichestvennogo opredeleniia elementov. Leningrad, 1964. 146 p. (MIRA 18:1)

1. Leningrad. Universitet.

TIKHOMIROV, V.I.; KUZNETSOVA, A.A.; BATOROVSKAYA, E.D.

Extraction of uranium (VI) with n-trioctylamine (TOA) in the presence of some cations. Radiokhimiia 6 no.3:17[illegible]

Extraction of uranium (VI) with n-trioctylamine (TOA) in the presence of some cations. Part 2:Chloride solutions. Ibid.:182-187

Extraction of uranium (VI) with n-trioctylamine (TOA) in the presence of some cations. Part 3:Sulfate solutions. Ibid.:18[illegible]91 (MIRA 17:6)

TIKHOMIROV, V.I.; LEVIKOV, A.A.

Quasi-optimal linear filters for pulse signals. Radiotekhnika 20 no.1:10-17 Ja '65. (MIRA 18:4)

1. Deystvitel'nyye chleny Nauchno-tekhnicheskogo obshchestva radiotekhniki i elektrosvyazi imeni Popova.

TIKHOMIROV, V.I.; VASIL'YEVA, N.I.

Iron oxidation rate during its heating of short duration in carbon dioxide. Vest. LGU 20 no.16:113-118 '65. (MIRA 18:9)

DITMAR, V.I.; TIKHOMIROV, V.I.

Middle Paleozoic red-bed halogen sediments in the southwestern part of central Kazakhstan. Dokl. AN SSSR 164 no.2:418-421 S '65. (MIRA 18:9)

1. Institut geologii i razrabotki goryuchikh iskopayemykh, Moskva. Submitted May 26, 1965.

L 39050-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/WB

ACC NR: AP6020917 (A) SOURCE CODE: UR/0369/66/002/002/0200/0203

AUTHOR: Gorbunov, S. A.; Korolev, N. V.; Tikhomirov, V. I.

ORG: Leningrad State University im. A. A. Zhdanov (Leningradskiy gosudarstvennyy universitet)

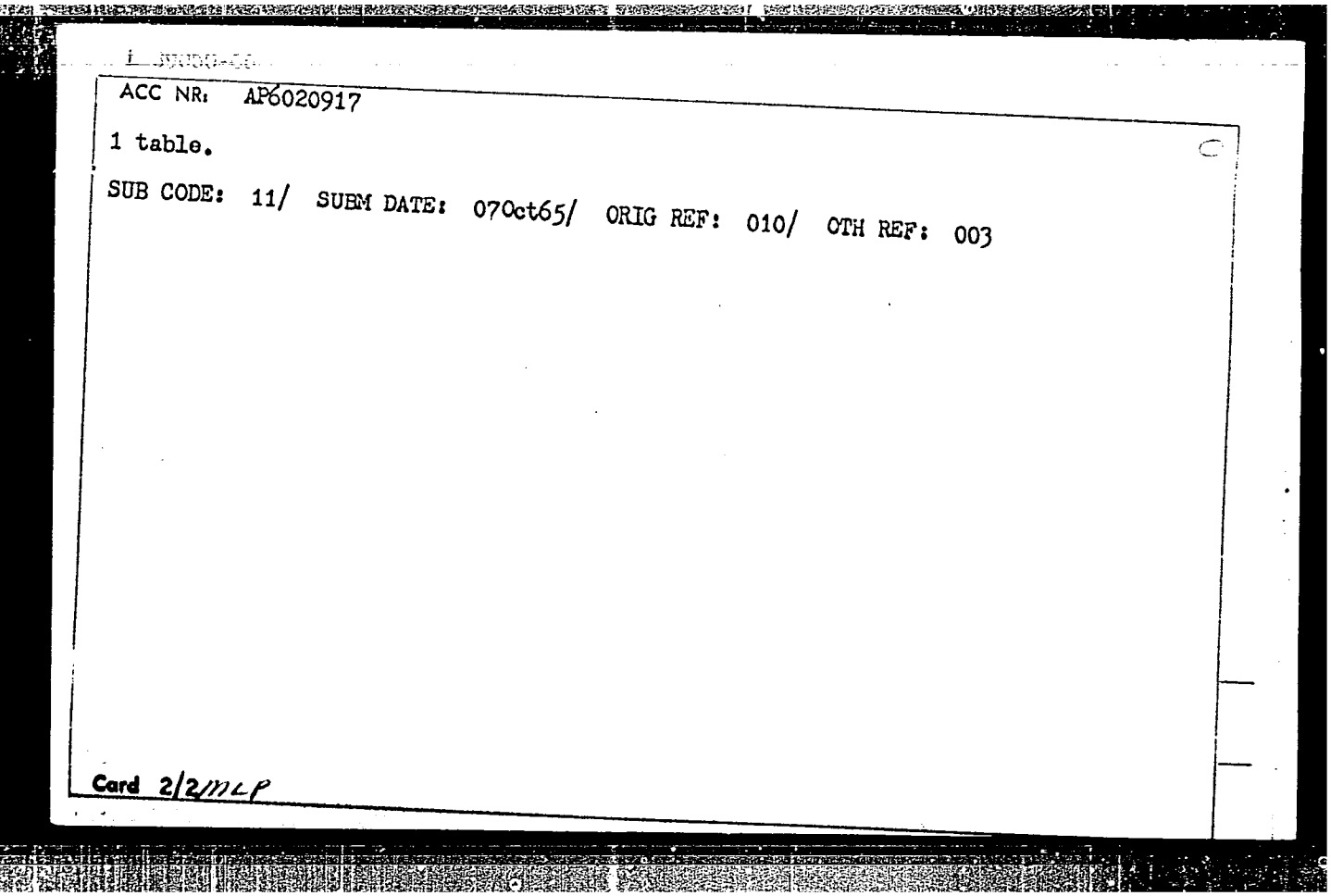
TITLE: Participation of nitrogen in the oxidation of titanium in air at high temperatures

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 2, no. 2, 1966, 200-203

TOPIC TAGS: nitrogen, titanium, metal oxidation, high temperature oxidation

ABSTRACT: The main purpose of the work was to determine nitrogen directly in the surface layer of specimens of VT1 titanium alloy oxized in air at 800-1200°, using spectral analysis and microhardness measurements. The surface gas-saturated layer on specimens oxidized at 1100-1200° was found to have a high nitrogen content (up to 3%). The main cause of the enrichment of the metal surface layer with nitrogen following oxidation in air at 1100-1200° is thought to be the reaction of titanium with atmospheric nitrogen. No pure nitride compounds are formed; the surface consists of a complex interstitial solid solution of oxygen, nitrogen, and partially carbon in α-titanium. This is due to the characteristics of the structure α-Ti, which has octahedral voids of large size. The participation of atmospheric nitrogen in the oxidation of titanium at high temperatures affects the entire oxidation process. Orig. art. has: 1 figure and

Card 1/2



ACC NR: AP6020917

1 table.

SUB CODE: 11/ SUBM DATE: 07Oct65/ ORIG REF: 010/ OTH REF: 003

Card 2/2 mlp

ACC NR: AP7004389 SOURCE CODE: UR/0054/66/000/004/0155/0157

AUTHOR: Tikhomirov, V.I.; D'yachkov, V.I.

ORG: none

TITLE: Ivestigation of the oxidation rate of titanium in oxygen

SOURCE: Leningrad.. Universitet. Vestnik. Seriya fiziki i khimii, no. 4, 1966, 155-157

TOPIC TAGS: ~~titanium~~ metal oxidation, oxidation rate, ~~oxidation rate~~ temperature dependence, ~~titanium~~ metal diffusion, ~~diffusion coefficient~~ titanium

ABSTRACT: High-purity titanium was oxidized at 750—1050C for 3 hr in pure oxygen at a pressure of 164 mm Hg. It was found that titanium oxidation proceeded in accordance with Evan's equation, and that the oxygen dissolving in the metal had no substantial effect on the oxidation rate or the course of the oxidation process. A sharp increase in the inclination of the temperature-dependence curve for the linear component of the oxidation rate in the 850—900C range is probably associated with the α-β transformation of titanium. The causes of the analogous course of

Card 1/2 UDC: 541.124/128

ACC NR: AP7004389

the parabolic component in the same temperature range are not clear, although it agrees qualitatively with the course of the coefficient of the oxygen diffusion in rutile of stoichiometric composition. The values of the apparent activation energy of chemical reaction and of diffusion processes were found to be respectively 63 and 37 kcal/g·mol at temperatures below 900C. Taking into account the total amount of oxygen dissolved in the metal during oxidation, the calculated coefficient of oxygen diffusion into titanium was $9.4 \cdot 10^3 e^{\frac{68500}{RT}}$ in the 750—1050C range. Orig. art. has: 3 figures and 1 table. [MS]

SUB CODE: 11/ SUBM DATE: 29Apr66/ ORIG REF: 002/ OTH REF: 007/
ATD PRESS: 5116

Card 2/2

D'YACHKOV, V.I., inzh.; FEDOROV, A.K., inzh.; BOGDANOV, V.N., inzh.; TIKHOMIROV, V.I., doktor khim.nauk

Method of preventing oxidation of seams during the welding of pipes by high-frequency currents. Svar.proizv. no.4:30-3? Ap '64. (MIRA 18:4)

1. Nauchno-issledovatel'skiy institut tokov vysokoy chastoty im. V.P.Vologdina.

TIKHOMIROV, V.I.; KORYTKOVA, E.I.

Copper oxidation rate on short-duration heatings up to high temperatures. Vest. LGU 19 no.4:126-131 '64. (MIRA 17:3)

ACCESSION NR: AP4029388 S/0135/64/000/004/0030/0031

AUTHOR: D'yachkov, V. I. (Engineer); Fedorov, A. K. (Engineer); Bogdanov, V. N. (Engineer); Tikhomirov, V. I. (Doctor of Chemical Sciences)

TITLE: A method of protecting seams from oxidation in welding pipes by high frequency currents

SOURCE: Svarochnoye proizvodstvo, no. 4, 1964, 30-31

TOPIC TAGS: oxidation, welding, high frequency current, cellulose, nitrocellulose, cellophane

ABSTRACT: The authors included a means of supplying a heated surface with organic substances, with which the products of thermal dissociation combine oxygen in stable chemical compounds, thereby avoiding metal oxides in the weld seams which lower the mechanical strength. This may be accomplished by a gas medium formed by the dissociation products of cellophane and nitrocellulose. This medium has good protective properties and does not cause carbonization of the metal in the heating zone. The authors conclude that the best regime for welding No. 10 and No. 20 pipes with high-frequency currents (induction heating) with the above-mentioned protective media is by heating to 1280-1300°C after first dressing the surfaces to be welded. The

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ACCESSION NR: AP4029388

amount of the protective material must not be too great. Orig. art. has: 2 figures

ASSOCIATION: NIITVCh im. V. P. Vologdina

SUBMITTED: 00 DATE ACQ: 28Apr64 ENCL: 00

SUB CODE: ML NO REF SOV: 002 OTHER: 000

Card 2/2

TIKHOMIROV, V.I.

Action of ions on the mutual ordering of water molecules in aqueous solutions. Zhur.strukt.khim. 4 no.4:521-526 Jl-Ag '63. (MIRA 16:9)

1. Institut obshchey i neorganicheskoy khimii imeni Kurnakova AN SSSR.

(Water) (Ions) (Chemical structure)

ANDRIANOV, D.P., doktor ekon. nauk, prof.; GENDEL'MAN, M.Z., kand. tekhn. nauk, dots.; GLICHEV, A.V., kand. ekon. nauk, dots.; DIDENKO, S.I., kand. ekon. nauk, dots.; ZHURAVLEV, A.N., kand. tekhn.nauk, prof.; ZAKHAROV, K.D., kand. tekhn.nauk,, dots.; MOISEYEV, S.V., kand. tekhn. nauk, dots.; OL'SHEVETS, L.M., kand. tekhn. nauk, dots.; ORLOV, N.A., prof.; POPOV, P.G., ispolnyayushchiy obyazannosti dots.; SARKISYAN, S.A., kand. ekon. nauk, dots.; STARIK, D.E., kand. tekhn.nauk, ispolnyayushchiy obyazannosti dots.; TER-MARKARYAN, A.N., kand. tekhn. nauk, prof.; TIKHOMIROV, V.I., kand. tekhn.nauk, prof.; CHESNOKOV, V.V., kand. ekon. nauk, dots.; SHERMAN, Ye.I., kand. ekon. nauk, dots.; EL'BERT, L.M., kand. ekon. nauk, dots.; LAPSHIN, A.A., dots., retsenzent; NOVATSKIY, V.F., kand. ekon. nauk, red.; TUMYANSKAYA, F.G., red. izd-va; KARPOV, I.I., tekhn. red.

[Organization, planning and economics of airplane production] Organizatsiia, planirovanie i ekonomika aviatsionnogo proizvodstva. [By] D.P.Andrianov i dr. Moskva, Oborongiz, 1963. 694 p. (MIRA 16:10)
(Airplane industry--Management)

TIKHOMIROV, V.I.; LEVIN, B.V.; MIRONOVA, V.V.; SOLOVAYA, V.M.

Precipitation of peroxide compounds of zirconium from sulfuric acid solutions. Zhur. neorg. khim. 7 no.8:1860-1868 Ag '62. (MIRA 16:6)

1. Institut obshchey i neorganicheskoy khimii imeni N.S. Kurnakova AN SSSR.
(Zirconium compounds) (Peroxides)

AL'BREKHT, V.G., prof.; DUBITSKIY, M.N., kand. tekhn. nauk; ISAKOV, L.M., kand. tekhn. nauk, dots.; KONDAKOV, N.P., kand. tekhn.nauk, dots.; Prinimali uchastiye: SHUL'GA, V.Ya., kand. tekhn. nauk, dots.; ANGELEYKO, V.I., prof.; CHLENOV, M.T., kand. tekhn.nauk, retsenzent; TIKHOMIROV, V.I., inzh., retsenzent; POTOTSKIY, G.I., inzh., red.; MEDVEDEVA, M.A., tekhn. red.

[Planning of the organization of track maintenance and repair work] Proektirovanie organizatsii putevykh rabot. [By] V.G. Al'brekht i dr. Moskva, Transzheldorizdat, 1963. 186 p. (MIRA 16:9)

(Railroads--Track)

TIKHOMIROV, V.I.

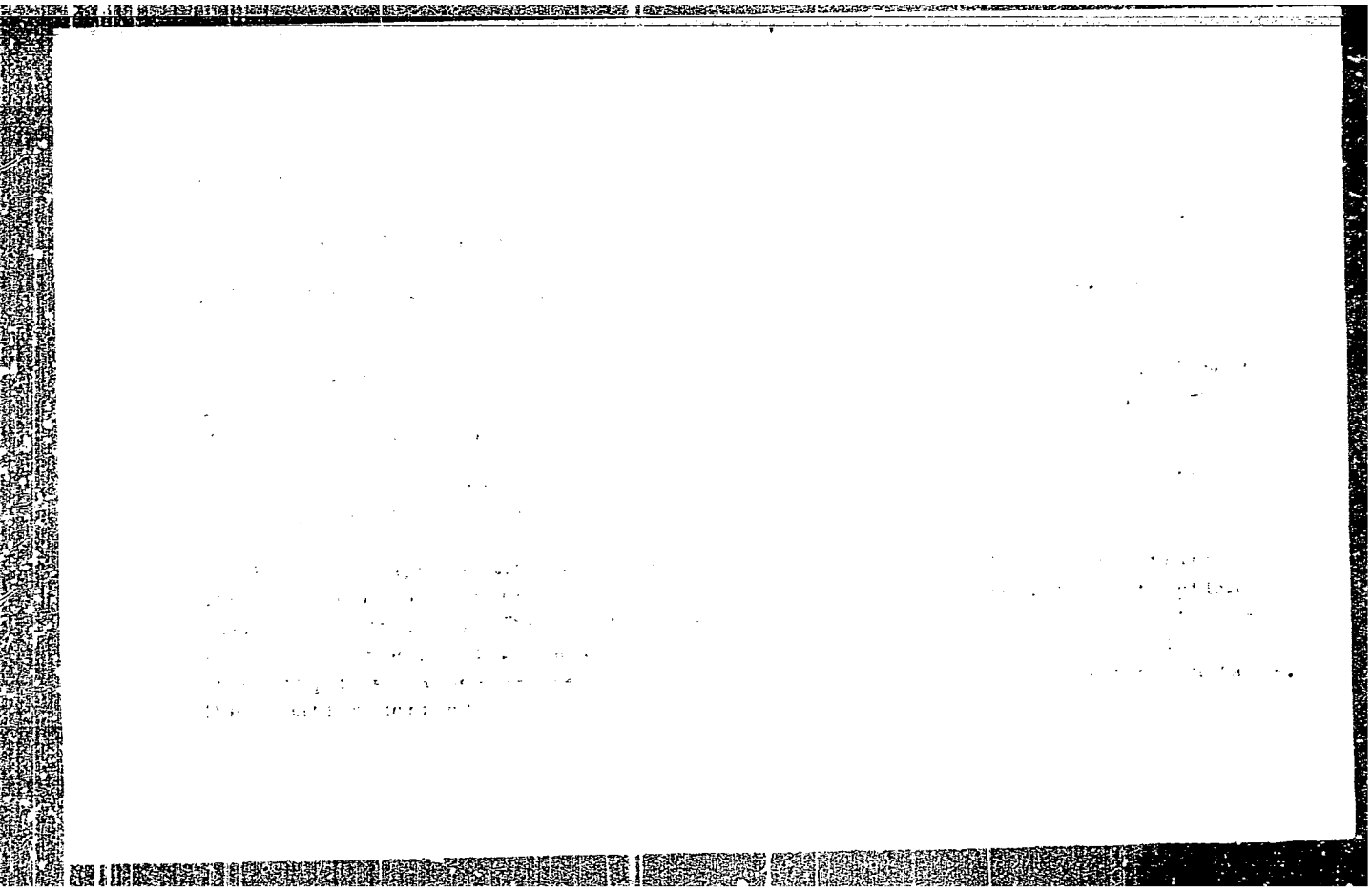
Average coordination numbers of ions in aqueous solutions as a measure of near hydration. Zhur.strukt.khim. 3 no.6:662-664 '62. (MIRA 15:12)

1. Institut obshchey i neorganicheskoy khimii imeni N.S. Kurnakova AN SSSR.
(Electrolyte solutions) (Ions) (Hydration)

TIKHOMIROV, V.I., inzh., starshiy prepodavatel'

Railroad employees study in correspondence institutes. Put' i put.khoz. 7 no.2:30-31 '63. (MIRA 16:2)

1. Vsesoyuznyy zaochnyy institut inzhenerov zheleznodorozhnogo transporta.
(Railroads—Employees—Education and training)



APPROVED FOR RELEASE: 07/16/2001 CIA-RDP86-00513R001755610008-8"

permits definition of the titration curve slope for titration of any metal ion

ASSOCIATION: none

SUBMITTED: 28Sep

ENCL: 00

SUB CODE: GC

KLAUZ, Pavel Leonidovich, kand. tekhn. nauk, dots.; KRYUKOV, Georgiy Nikolayevich, kand. tekhn. nauk, dots.; CHERNYSHEV, M.A., prof., retsenzent; ALEKSEYEV, A.P., kand. tekhn. nauk, retsenzent; IVANOV, K.Ye., kand. tekhn. nauk, retsenzent; TIKHOMIROV, V.I., inzh., retsenzent; NEKLEPAYEVA, Z.A., inzh., red.; USENKO, L.A., tekhn. red.

[Organization and operation of mechanized construction and track maintenance work]Organizatsiia i proizvodstvo mekhanizirovannykh stroitel'nykh i putevykh rabot. Moskva, Transzheldorizdat, 1962. 267 p. (MIRA 15:12)
(Railroads—Maintenance and repair)
(Railroads—Construction)

TIKHOMIROV, V.I., starshiy prepodavatel'

"Determining the economic efficiency of measures for the mechanization of track overhauling work" by [inzh.] M.N. Dubitskii, [kand.tekhn.nauk] K.E. Ivanov. Review by V.I. Tikhomirov. Put' i put.khoz. no.7:43 '62. (MIRA 15:7)

1. Vsesoyuznyy zaochnyy institut inzhenerov zheleznodorozhnogo transporta.

(Railroads—Maintenance and repair)
(Dubitskii, M.N.) (Ivanov, K.E.)

TIKHOMIROV, V.I., inzh.

Advantages of using long "intervals." Zhel.dor.transp. 44 no.7:49 Jl '62. (MIRA 15:8)
(Railroads--Maintenance and repair)

23870

S/186/61/003/001/003/020
A051/A129

21,3200

AUTHORS: Kuznetsova, A.A., Samoylov, O.Ya., Tikhomirov, V.I.

TITLE: The salting-out action of cations and the covalency of their interaction with the water molecules of the solution

PERIODICAL: Radiokhimiya, v 3, no 1, 1961, 10-13

TEXT: The cause for the decrease in the effectiveness of the salting-out agent with an increase in the covalency of its interaction with water, viz. the fact that the covalent interaction of the cation of the salting-out agent with the water molecules closest to it brings about a decrease in the effective charge of the cation (Ref. 1), was investigated. A comparative study was made of the salting-out action of the nitrates, the cations of which have the same charges and radii, but differ in the structure of their electron shells. A further study was made of the effect of nitrates of rubidium, thallium (I), nickel (II) and cobalt (II) on the distribution of small quantities of uranylnitrate between aqueous solutions and diethyl

Card 1/8

The salting-out action of cations ...

ether. It was established that the chosen salting-out agents in the experiments were poorly soluble in diethyl ether and did not pass into the organic layer under the given conditions of the experiments. The relationship of the distribution coefficient of uranylnitrate to the concentration of the salting-out agents was investigated in the initial aqueous solutions. Table 1 shows the results of the determinations of the uranylnitrate distribution coefficients between diethyl ether and aqueous solutions containing Rb^{+} and Tl^{+} nitrates. It is seen therefrom that the coefficients of the uranylnitrate distribution between the diethyl ether and aqueous solutions containing these nitrates are very low, and the difference between the average values of α is slight. Table 2 lists the values of the coefficients of uranylnitrate distribution between diethyl ether and aqueous solutions in the presence of Mg^{2+}, Ni^{2+} and Co^{2+}, and the graph shows the graphical relationship of α to the concentration at 25°C. From the latter it is seen that in the case of cobalt and nickel nitrates the relationship of α (c) is expressed by one curve and they are much less effective as salting-out agents than Mg^{2+}. With an increase in the temperature from 0 to 25°C there is a drop in the distribution coefficient of the uranylnitrate in all cases, but

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The salting-out action of cations ...

S/186/61/003/001/003/020
A051/A129

the indicated difference in the salting-out action of Ni^{2+} and Co^{2+} as compared to that of Mg^{2+} is maintained both at 0 and at 25°C. The authors conclude that the former relationship of the salting-out effect to the covalency of the interaction of its cations with the water molecules of the solution given in Ref 1 is confirmed. The observed effects were also investigated with relation to the pH of the solution. It is assumed by the authors that in view of the experimental results this observed effect should decrease with an increase in the acidity and the salting-out agents can become reverse in their salting-out action. There are 2 tables, 1 graph and 5 Soviet-bloc references.

Card 3/6

S/186/61/003/003/018/018
E071/E435

AUTHORS: Nikolayev, A.V., Tikhomirov, V.I., Rumyantseva, Z.G. and Levin, B.V.

TITLE: Entrapment of Alkali Cations by Uranium Peroxide Precipitates

PERIODICAL: Radiokhimiya, 1961, Vol.3, No.3, pp.372-373

TEXT: The authors investigated the entrapment of some cations of alkali metals during precipitation of uranium peroxide from uranyl sulphate solutions at 50 to 60°C with a large excess of hydrogen peroxide. The concentration of the starting solution was 20 g/l, pH = 2; of the final solution pH = 1. For the determination of sodium entrapment Na^{24} was used. The results obtained indicate that within the range investigated (0.01 to 0.02 M) the concentration of sodium in the starting solution has little influence on its entrapment in the precipitate (0.01 to 0.009% of the sodium present in the solution). For the determination of cesium its radioactive isotope was used (with and without a carrier). The experimental results indicate that: (a) entrapment of cesium by the peroxide precipitate is hundreds of times higher

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than that of sodium and undoubtedly can not be explained by the adsorption mechanism; (b) similarly to sodium, the percent entrapped is independent of concentration. According to the literature, potassium is also entrapped in uranium peroxide precipitates. Therefore, it can be assumed that the increase in the degree of entrapment increases with increasing ionic radius, or with the strength of the corresponding formations in the precipitate. There are 2 tables and 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English language publication reads as follows: G.W.Watt, S.L.Achorn, I.L.Marley, J.Am.Chem.Soc., 72, 8, 3341 (1950).

SUBMITTED: May 24, 1960

Card 2/2

23871
S/186/61/003/001/004/020
A051/A129

21,3200

AUTHORS: Samoylov, O.Ya., Tikhomirov, V.I., Ionov, V.P., Kuznetsova, A.A.

TITLE: The relationship between the effectiveness of the salting-out agent and the hydration of the salting-out ion

PERIODICAL: Radiokhimiya, v 3, no 1, 1961, 14-18

TEXT: In the present work the authors have investigated the relationship between the effectiveness of the salting-out agent and the hydration of the salting-out ion, using the qualitative theory developed in Ref 1. It is seen that the stronger the salting-out cation is hydrated, the more effective the given salting-out agent should be in relation to it, i.e., the higher should be the value of its $\Delta E_{\text{salting-out}}$ (a decrease in the energy of activation of the water molecule extraction from the closest surroundings of the extracted ion). Thus,

$$\Delta E_{\text{salting-out}} \approx \frac{k}{s_i^3} \quad (3),$$

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The relationship between the effectiveness ...

where k is a coefficient depending on the cation charge of the salting-out agent, dipole moment of the water molecule and characteristics of the water solution, and $\bar{S}_1$ – the average (effective) distance between the salting-out cation and the cation of the salting-out agent. With an increase in the hydration of the salting-out ion, the value of $E_{salting\text{-}out}$ related to the action of a certain salting-out agent on it increases: (4)

$$(\Delta E_{salt.-out})_i > (\Delta E_{salt.-out})_j \quad \text{or} \quad (\Delta E_{salt.-out})_i = \gamma (\Delta E_{salt.-out})_j$$

where the coefficient $\gamma > 1$. For various salting-out agents it is assumed that the values of the coefficients are about equal, then:

$$(\Delta E^s_{salt.-out})_i = \gamma (\Delta E^s_{salt.-out})_j \quad (5)$$

where s = 1,2,3, corresponding to the different salting-out agents. The authors investigate the salting-out ions i and j, whereby the i-ion is characterized by a higher hydration than the j-ion. It is established that the relationship of $\Delta E_{salt.-out}$ to the hydration of the salting-out ion

The relationship between the effectiveness...

brings about the equations

$$\left(\frac{a^1}{a^2}\right)_i > \left(\frac{a^1}{a^2}\right)_j \qquad (9)$$

(where a is the distribution coefficient [Ref 17]). It is confirmed experimentally by investigating the extraction of uranyl and thorium with tributylphosphate from water solutions containing magnesium, calcium and strontium nitrates. Equation 9 indicates that with a strengthening of the hydration of the salting-out ion the relative increase in the distribution coefficient grows, determined by the growth of the effectiveness of the salting-out agent. Table 1 lists the determined values of the distribution coefficients of uranyl and thorium, and table 2 lists the ratios of the distribution coefficients for uranyl and thorium in the presence of various salting-out agents from a group of magnesium, calcium and strontium nitrates. The ratios taken are that of the distribution coefficients in the presence of a more effective salting-out agent to the value of the distribution coefficient in the presence of a less effective salting-out agent. The data of table 2 show that these ratios for thorium are greater than for uranyl. Since thorium is

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The relationship between the effectiveness...

hydrated more strongly in aqueous solutions than uranyl, it is concluded that the experimental results confirm the validity of equation (9). There are 2 tables, 9 formulae and 6 references: 4 Soviet-bloc, 2 non-Soviet-bloc.

Card 4/6

TIKHOMIROV, V.I., inzh., aspirant

Characteristics of tracklaying on reinforced concrete slabs.
Put' i put. khoz. 8 no.7:7-8 '64. (MIRA 17:10)

1. Vsesoyuznyy zaochnyy institut inzhenerov zheleznodorozhnogo transporta.

DITMAR, V.I.; TIKHOMIROV, V.I.

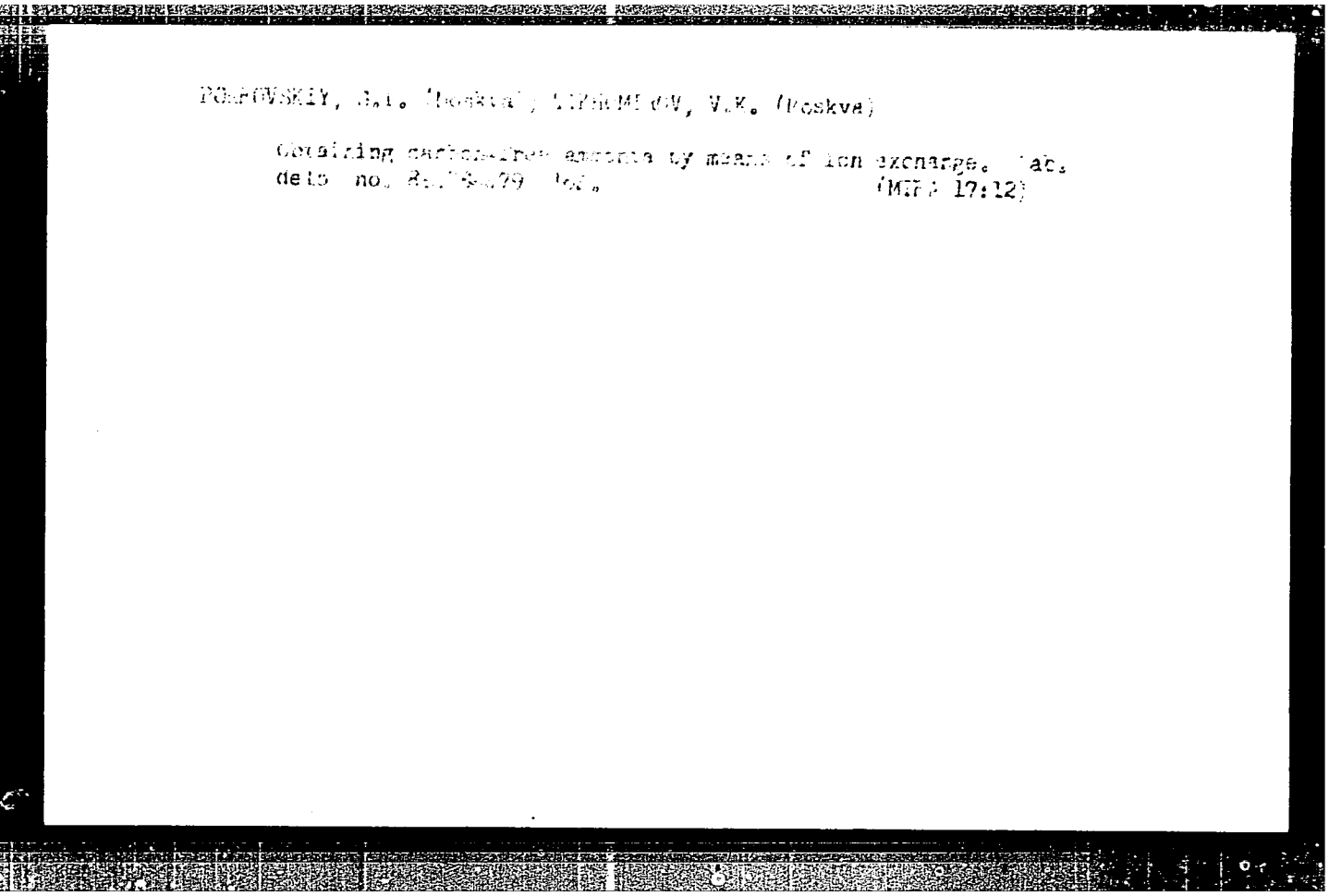
Permian halogen sediments in the southwestern part of central Kazakhstan. Dokl. AN SSSR 158 no.5:1089-1092 O '64. (MIRA 17:10)

1. Institut geologii i razrabotki goryuchikh iskopayemykh. Predstavleno akademikom N.M.Strakhovym.

SAMOYLOV, O. Ya.; TIKHOMIROV, V.I.

Salting out and exchange of water molecules in the vicinity of ions in aqueous solutions. Radiokhimiia 2 no.6:183-191 '60. (MIRA 14:4)

(Salting-out)



POLYANSKIY, G.A. (Moskva); KIPRIANOV, V.K. (Moskva)

Obtaining carbon-14 enriched by means of ion exchange. Zhur. fiz. khim. no. 8:1779-1779 '64. (MIRA 17:12)

SOV/110-59-9-13/22

AUTHORS: Gorskiy, Yu.M., and Tikhomirov, V.K. (Engineers)

TITLE: A Magnetic Impulse Method of Recording Torque on the Shafts of Electrical and Other Machines

PERIODICAL: Vestnik elektropromyshlennosti,1959,Nr 9,pp 46-50 (USSR)

ABSTRACT: The torque on an alternator shaft may be recorded by measuring the angle of twist on a section of the shaft between the turbine and generator. Existing strain-gauge, induction and other methods of measuring torque are difficult to apply and subject to error. It is particularly desirable to avoid errors caused by bending and compression of the shaft, also those involved in passing the measurement currents through sliding contact. In these respects the magnetic impulse method offers advantages. The principle of the method consists in measuring the phase displacement between impulses recorded on ferro-magnetic coatings mounted on the shaft at two sections between the turbine and the generator, as illustrated schematically in Fig 1. The impulses are magnetically recorded either directly on the surface of the shaft or on a special disc surfaced with recording material. This method of recording impulses is widely used in computers. The sensitivity of phase-displacement measurements may be increased by using

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A Magnetic Impulse Method of Recording Torque on the Shafts of Electrical and Other Machines

a large number of impulses around the discs. The phase difference between the signals is measured by a triggering circuit to which the amplified impulses are applied. A balancing circuit, shown diagrammatically in Fig 2, is used so that torques of either sign can be measured. The output voltage of the equipment is proportional to the phase displacement, and may be applied either to a voltmeter calibrated in units of torque or to an oscillograph or recording voltmeter. Experimental torque-measuring equipment was applied to a machine of 2.5 kW running at 5000 rpm for which the conditions of measurement were rather difficult. It was first necessary to design a signalling device of special construction, illustrated in Fig 3, consisting of a replaceable calibrated shaft 250 mm long with discs rigidly connected to it. The surfaces of the discs were coated with a recording medium of nickel-cobalt. The diameter of the replaceable shaft was selected according to the torque to be transmitted; three shafts were used, of 6, 8, 10 mm diameter respectively, and the corresponding angles of twist at rated torque were

A Magnetic Impulse Method of Recording Torque on the Shafts of Electrical and Other Machines

3°, 1° and 0.4°. A block circuit diagram of the equipment for recording torque is shown in Fig 4. The operating principles of the circuit are described. The impulses are recorded and read back by a universal magnetic head from a type M-3 computer. Impulse durations of 3-3.5 microseconds and amplitudes of 2-2.5 A were chosen, to suit the recording conditions. For the same reason the auxiliary generator in the apparatus operated at 18 kc/s. Accordingly 110 impulses were recorded on each disc. An integrating device was provided so that rapid changes of torque could be recorded on an electro-magnetic oscillograph, the elements of which have a high natural frequency. An explanation is given of the steps taken to ensure that the output of the instrument depends only on the phase displacement between the recorded impulses and not on the speed of rotation of the machine under investigation. The instrument is calibrated in torque units under steady operating conditions at different loads or by the use of an electromagnetic brake. The accuracy of torque measurements depends mainly on the stability of the supply voltage, the accuracy of the recording device and the drift in the

A Magnetic Impulse Method of Recording Torque on the Shafts of Electrical and Other Machines

equipment. If a stabilised supply is used and appropriate corrections are taken, it appears that torque measurements are accurate to within ± 2-3% when measured on a pointer type instrument, and to ± 4-8% when a recorder is used. This is satisfactory for most practical purposes. An oscillogram of torque variations measured during investigations of transient processes in an analogue of a power system are given in Fig 5. The equipment is suitable for use in the laboratory or in the field. The signals may be recorded on powder coatings sprayed on to a ground surface of the shaft, alternatively, for slow machines, recording tape may be stuck on the shaft. All these circuits can employ transistors and this improves the reliability of the device. In applying the magnetic impulse method under operating conditions magnetic screening may be required. There are 5 figures and 3 Soviet references.

L 29126-66 EWT(m)
ACC NR: AP6019404 SOURCE CODE: UR/0240/65/000/011/0086/0091

AUTHOR: Petrukhin, N. V.(Chemical engineer); Pokrovskiy, S. I.; Tikhomirov, V. K.; Ryadov, V. G.(Candidate of medical sciences; Moscow)

ORG: none

TITLE: Determination of radiocesium in environmental objects

SOURCE: Gigiyena i sanitariya, no. 11, 1965, 86-91

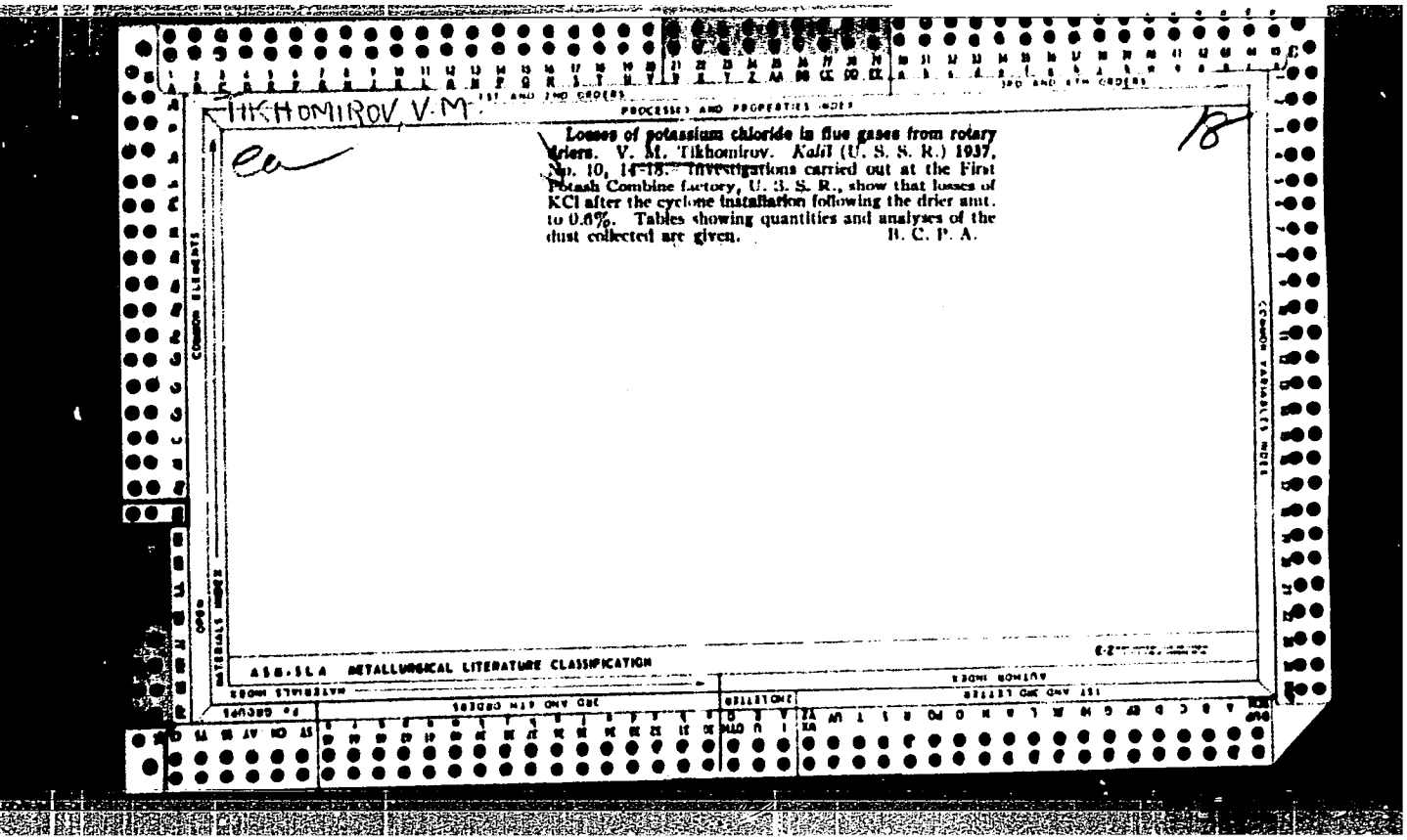
TOPIC TAGS: cesium, radioisotope, radiometry, radiation chemistry, scintillation spectrometer

ABSTRACT: The article is essentially a review of the literature. After briefly discussing the distribution and biological characteristics of Cs^{137}, the authors describe in detail methods of preparing samples (liquids, solids, and soil) for analysis. The various radiochemical methods of determining radiocesium are based on the principle of precipitation with specific reagents (12 are listed with the published source where they were first described) and an isotopic carrier, followed by measurement of the activity of the precipate. The carrier generally used is stable Cs, which as a chloride or nitrate solution is added to the solution obtained in the course of preparing the sample for analysis. Radiometry of the preparations is the final procedure. The author notes that spectrometric methods are coming into increasing use. They require crystalline or liquid scintillation elements with analyzers of different kinds of pulses as recording devices. Orig. art. has: 2 tables. [JPRS]

SUB CODE: 18, 07 / SUBM DATE: 11May65 / ORIG REF: 013 / OTH REF: 028

UDC: 614.73:546.176.02.137-074

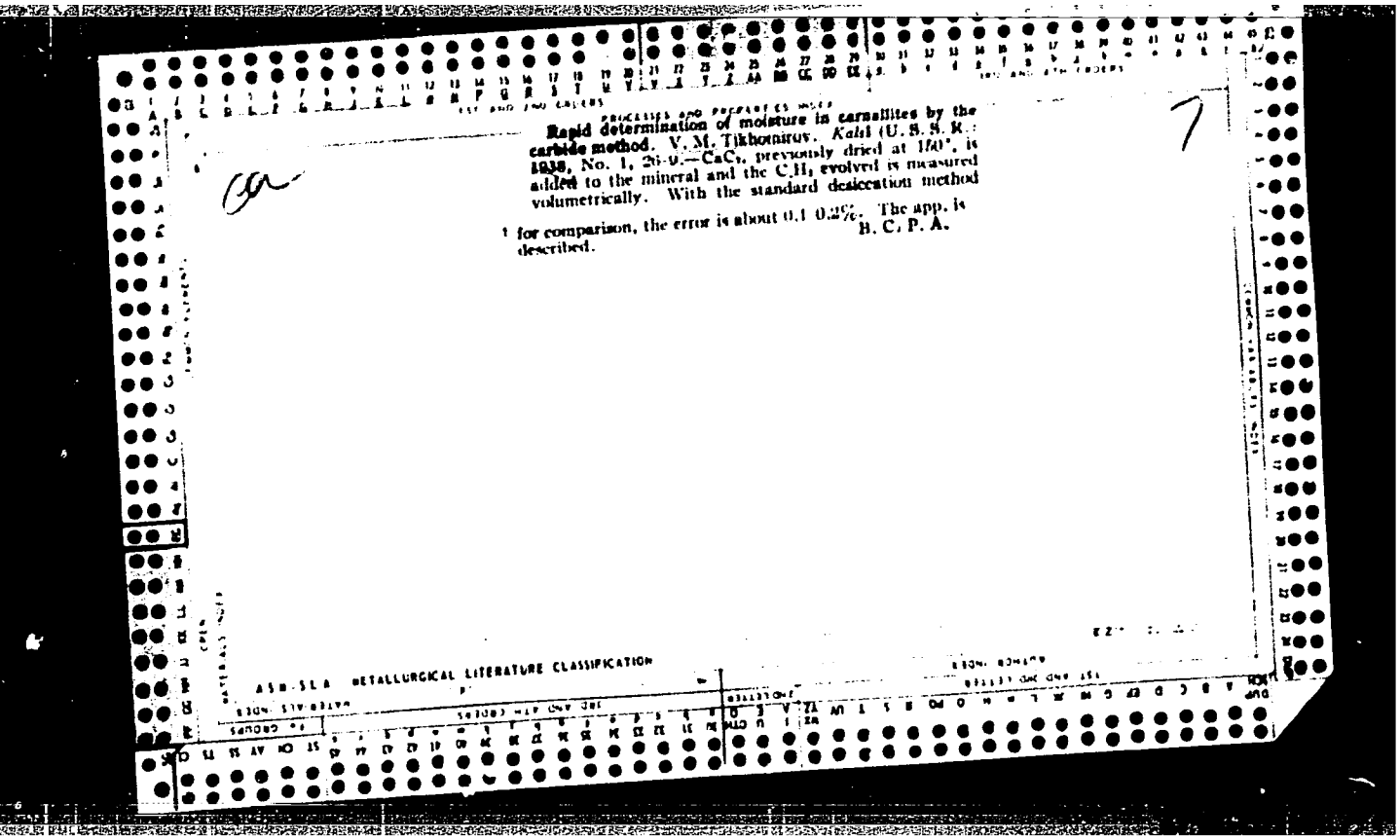
Card 1/1 cc



TIKHOMIROV, V.M.

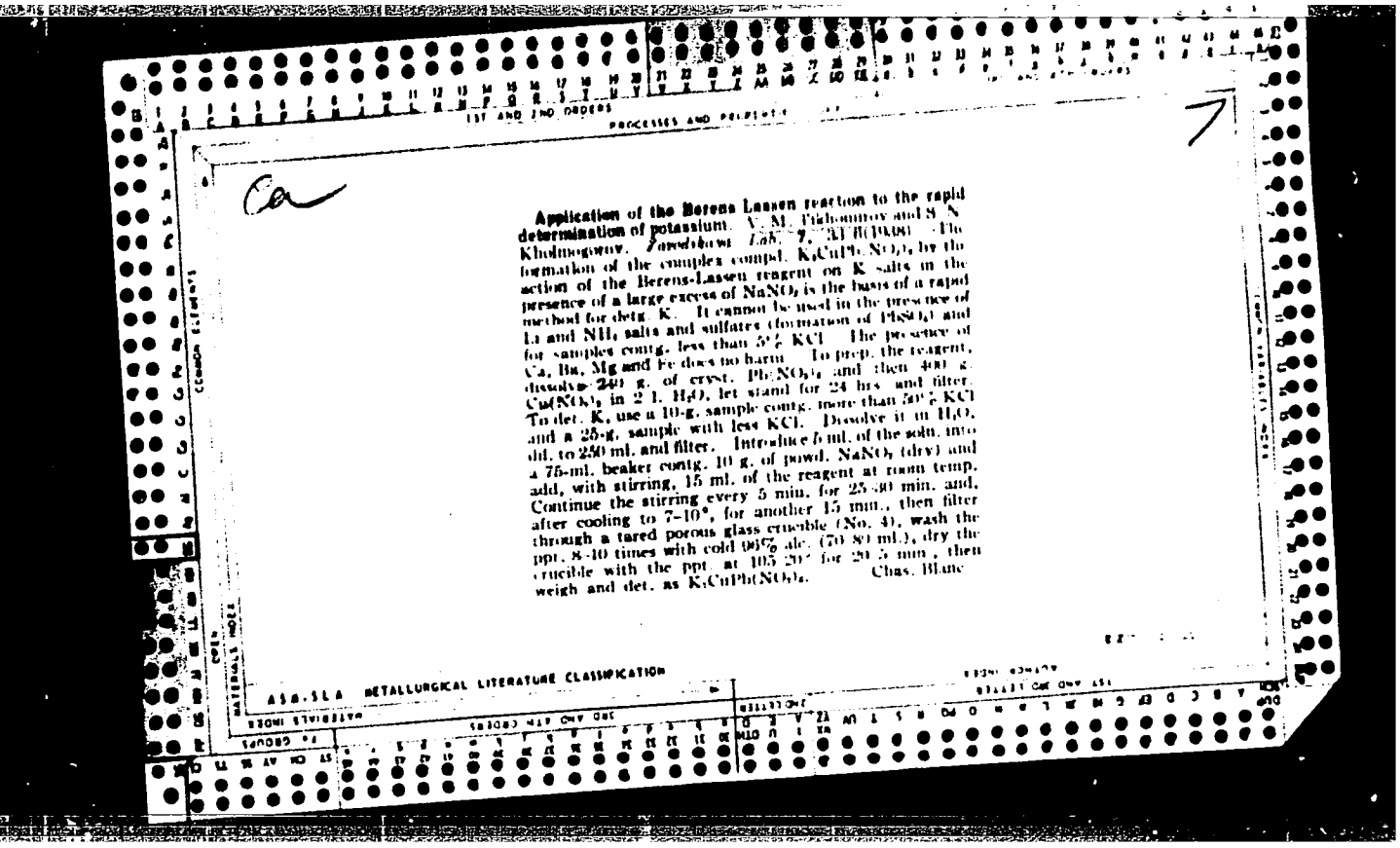
Losses of potassium chloride in flue gases from rotary driers. V. M. Tikhomirov. *Kalii* (U. S. S. R.) 1937, No. 10, 14–18. Investigations carried out at the First Potash Combine factory, U. S. S. R., show that losses of KCl after the cyclone installation following the drier amt. to 0.6%. Tables showing quantities and analyses of the dust collected are given. B. C. P. A.

ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION



Rapid determination of moisture in carnallites by the carbide method. V. M. Tikhonnirov. *Kalii* (U. S. S. R.) 1938, No. 1, 26-9.—CaC_2, previously dried at 180°, is added to the mineral and the C_2H_2 evolved is measured volumetrically. With the standard desiccation method for comparison, the error is about 0.1 0.2%. The app. is described. B. C. P. A.

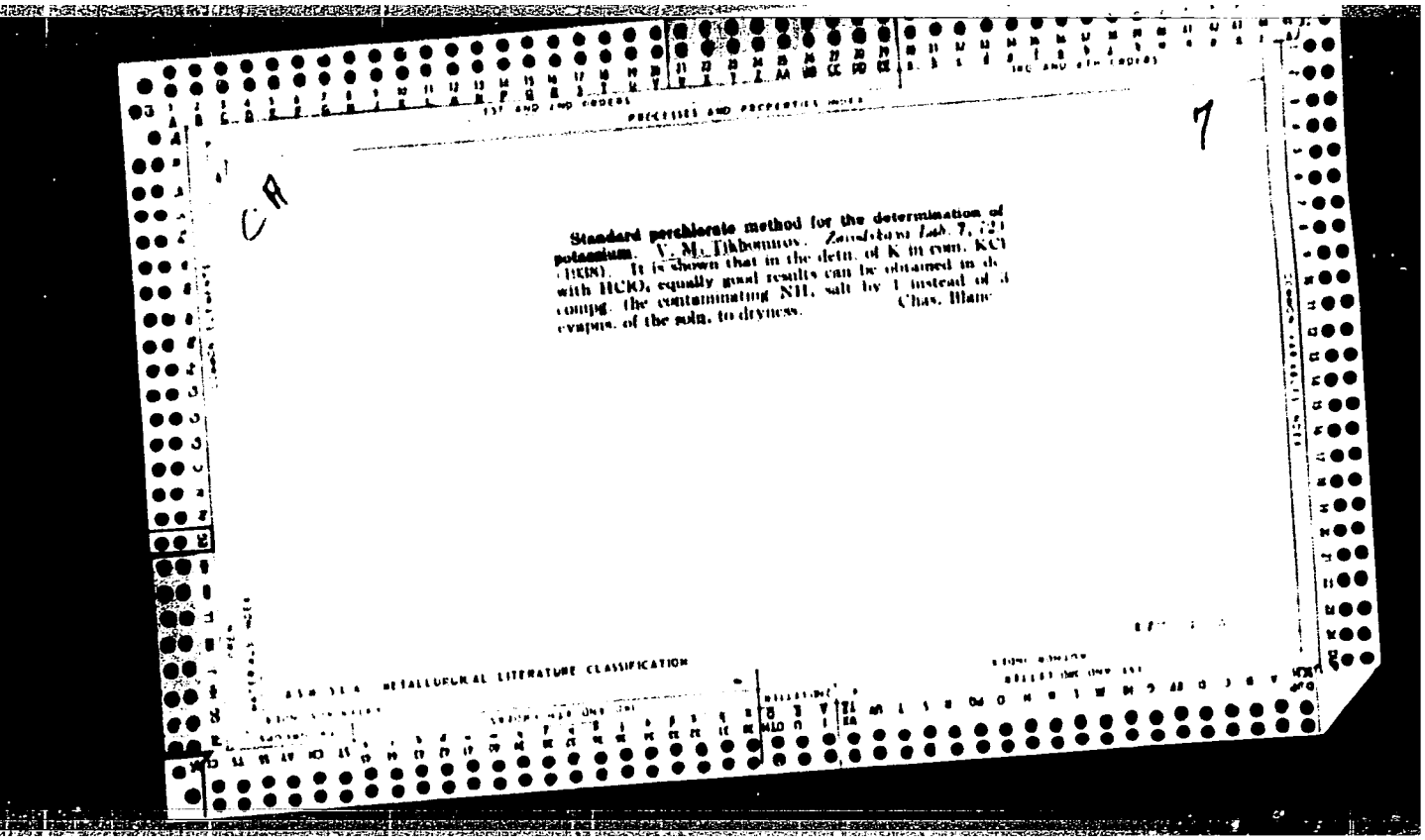
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Ca

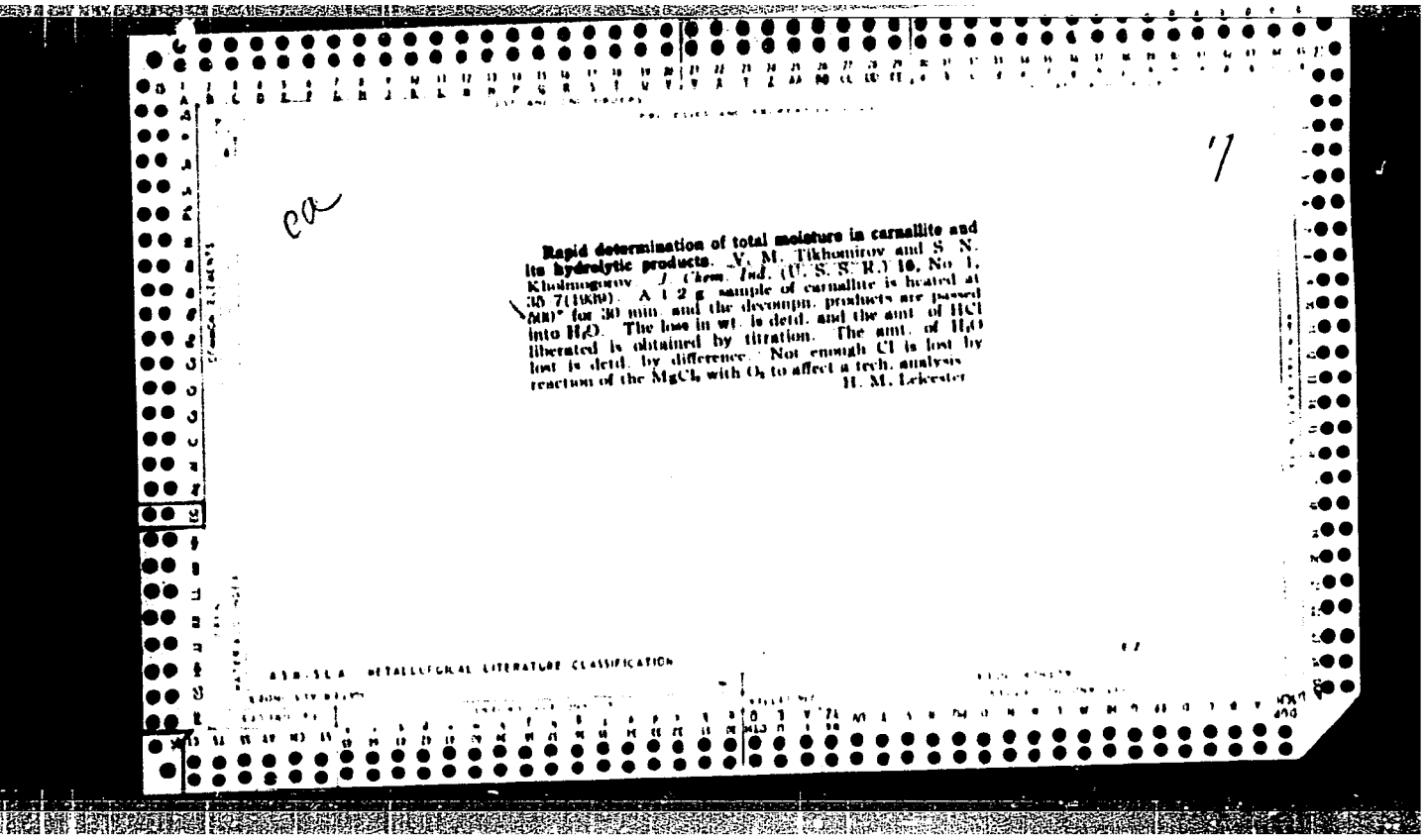
Application of the Berens Lassen reaction to the rapid determination of potassium. V. M. Fishmanov and S. N. Khalmogorov. *Zavodskaya Lab.* 7, 231-6(1938). The formation of the complex compd. $K_2CuPb_2(NO_2)_{10}$ by the action of the Berens-Lassen reagent on K salts in the presence of a large excess of $NaNO_2$ is the basis of a rapid method for detg. K. It cannot be used in the presence of Li and NH_4 salts and sulfates (formation of $PbSO_4$) and for samples contg. less than 5% KCl. The presence of Ca, Ba, Mg and Fe does no harm. To prep. the reagent, dissolve 240 g. of cryst. $Pb(NO_3)_2$ and then 400 g. $Cu(NO_3)_2$ in 2 l. H_2O, let stand for 24 hrs. and filter. To det. K, use a 10-g. sample contg. more than 50% KCl and a 25-g. sample with less KCl. Dissolve it in H_2O, dil. to 250 ml. and filter. Introduce 5 ml. of the soln. into a 75-ml. beaker contg. 10 g. of powd. $NaNO_2$ (dry) and add, with stirring, 15 ml. of the reagent at room temp. Continue the stirring every 5 min. for 25-30 min. and, after cooling to 7-10°, for another 15 min., then filter through a tared porous glass crucible (No. 4), wash the ppt. 8-10 times with cold 96% alc. (70-80 ml.), dry the crucible with the ppt. at 105-20° for 20-5 min., then weigh and det. as $K_2CuPb(NO_2)_6$. Chas. Blanc

A58-SLA METALLURGICAL LITERATURE CLASSIFICATION



Standard perchlorate method for the determination of potassium. V. M. Tikhomirov. *Zavodskaya Lab.* 7, 721 (1938). It is shown that in the detn. of K in com. KCl with HClO$_4$ equally good results can be obtained in sh coning the contaminating NH$_4$ salt by 1 instead of 3 evapns. of the soln. to dryness. Chas. Blanc

METALLURGICAL LITERATURE CLASSIFICATION



ca

Rapid determination of total moisture in carnallite and its hydrolytic products. V. M. Tikhomirov and S. N. Khodmogarov. *J. Chem. Ind.* (U. S. S. R.) **16**, No. 1, 35-7(1939). A 1-2 g. sample of carnallite is heated at 300° for 30 min. and the decompn. products are passed into H_2O. The loss in wt. is detd. and the amt. of HCl liberated is obtained by titration. The amt. of H_2O lost is detd. by difference. Not enough Cl is lost by reaction of the $MgCl_2$ with O_2 to affect a tech. analysis.
H. M. Leicester

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KARIMOV, M.S., inzh.; TIKHOMIROV, V.M.

State of stress of cement reinforced grounds. Vest. TSNII MPS 23 no.5:36-39 '64. (MIRA 17:11)

TIKHOMIROV, V.M.

New type of cutter for the grinding of insulators. Stek. i ker. 21 no.11:35-36 N '64. (MIRA 18:4)

TIKHOMIROV, V.M.

Note on n-dimensional cross sections of sets in Banach spaces.
Usp. mat. nauk 20 no.1:227-230 Ja-F '65.
(MIRA 18:4)

L 20771-66 EWT(d)/T/EWP(1) IJP(c)

ACC NR: AP6012025 SOURCE CODE: UR/0020/65/160/004/0774/0777

AUTHOR: Tikhomirov, V. M.

ORG: none

TITLE: Some problems in approximation theory

SOURCE: AN SSSR. Doklady, v. 160, no. 4, 1965, 774-777

TOPIC TAGS: approximation, Banach space

ABSTRACT: The article deals with four problems in approximation theory, where X is a real Banach space with unit sphere U and L_n its finite-dimensional subspace. Problem 1 is the approximation of individual functions by a fixed finite-dimensional subspace; this problem has been investigated in the works of I. ZINGER. Problem 2 is the approximation of convex sets by finite-dimensional subspaces. Some original approaches to this problem, which is related to the class of minimax problems, are contained in a joint work by the author and A. A. MILYUTIN. The present article cites one inconclusive, necessary condition of an extremal element in the space C_Q^B. Problem 3 deals with the diameters of sets. Problem 4 is to find

$$d^n(F) = \inf_{L^n} \inf_{\varepsilon} \{F \cap L^n \subset \varepsilon V \cap L^n\},$$

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L 20771-66
ACC NR: AP6012025

where L^n is a subspace of commensurability n: i.e., a subspace X consisting of elements f, for which $f_1^*(f) = \ldots = f_n^*(f) = 0$, and f_i^* are linearly independent elements in X^*. The basic results of the article relate to the space C_Q of continuous real functions on a topological bicompact space Q with metric $\|f\| = \max_{x \in Q} |f(x)|$. The author thanks A. A. Milyutin for his interest and discussions in this work. This paper was presented by Academician A. N. Kolmogorov on 20 Jul 1964. Orig. art. has: 3 formulas. [JPRS]

SUB CODE: 12 / SUBM DATE: 20Jul64 / ORIG REF: 008 / OTH REF: 001

Card 2/2

TIKHOMIROV, V.M.

Draw-in chuck with a mechanical ejector. Mashinostroitel' no.7: 22 Jl '65. (MIRA 18:7)

TIKHOMIROV, V.M.

Some problems in approximation theory. Dokl. AN SSSR 160 no.4: 774-777 F '65. (MIRA 18:2)

1. Submitted July 20, 1964.

TIKHOMIROV, V.M.

A.N.Kholmogorov's studies on ε-entropy of functional classes and superpositions of functions. Usp. mat. nauk 18 no.5:55-92 S-O '63. (MIRA 16:12)

TIKHOMIROV, V.M.

On ε-entropy of certain classes of periodic functions. Usp. mat.nauk 17 no.6:163-169 N-D '62. (MIRA 16:1)
(Functions, Periodic)

TIKHOMIROV, V.M.

Diameters of sets in functional spaces and the theory of best approximation. Usp.mat.nauk 15 no.3:81-120 My-Je '60. (MIRA 13:10)

(Approximate computation) (Functional analysis)

84761

S/042/60/015/003/003/016XX
C111/C222

16.4100 16.4100

AUTHOR: Tikhomirov, V.M.

TITLE: Diameters of Sets in Functional Spaces and the Theory of Best Approximations

PERIODICAL: Uspekhi matematicheskikh nauk, 1960, Vol.15, No.3, pp.81-120

TEXT: Let R be a metric space; $F \subset R$, $G \subset R$; $\delta(F,G) = \sup_{x \in F} \rho(x,G)$, where $\rho(x,G)$ is the distance of the point x from the set G. If R is at least n-dimensional, L_n - linear subspace and if the set F has the property that from $x \in F$ there follows $-x \in F$, then the diameter of F is defined by

(2) $d_n(F) = \inf_{L_n} \delta(F,L_n)$.

The $\hat{L}_n$ for which in (2) it holds $d_n(F) = \delta(F,\hat{L}_n)$ is called extremal. At first A.N.Kolmogorov (Ref.1) has pointed out that the determination of the diameters $d_n(F)$ and the extremal subspaces $\hat{L}_n$ is a natural problem of the theory of best approximations. Then this problem was treated in many papers: S.B.Stechkin (Ref.2), V.D.Yerokhin (Ref.3), V.M.Tikhomirov (Ref.4),

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Diameters of Sets in Functional Spaces and the Theory of Best Approximations

Favard (Ref.5), N.I.Akhiezer and M.G.Kreyn (Ref.6,7,8), B.Nagy (Ref.9) and K.I.Babenko (Ref.10). All these investigations gave the possibility of carrying out the representation of the results according to the following scheme. The author succeeded in giving the estimation from below $d_n(F) \geqslant d_n$. The papers (Ref.5-10) yield $\delta(F,L_n) \leqslant d_n$. From this it follows $d_n(F) = \delta(F,L_n) = d_n$. Here the estimation from below mostly is carried out by the application of the theorem 1: In an arbitrary space, for the set $F=U \cap L^*_{n+1}$, where U is the unit sphere and L^*_{n+1} is an arbitrary (n+1)-dimensional subspace, there holds the relation $d_n(F) = 1$.

In the present paper the author gives a survey of the results of (Ref.1,2, 5,6,7,8,9,10,16) and then he proves the results, where in general the above mentioned scheme is used. Finally he gives the example of a set the diameter of which becomes smaller for an imbedding into a space of greater dimension.

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84761

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C111/C222

Diameters of Sets in Functional Spaces and the Theory of Best Approximations

The author mentions S.M.Nikol'skiy, S.N.Bernshteyn, A.F.Timan, Yu.A.Brudnyy, Ya.G.Sinay, M.A.Krasnosel'skiy, Lyusternik, Shnirl'man, K.Borsuk, Ye.S. Fedorov, B.N.Delone and Vitushkin. He thanks A.N.Kolmogorov for giving the problem and aid. There are 25 references: 21 Soviet, 2 German, 1 French and 1 Polish.

SUBMITTED: December 12, 1959

Card 3/3

16(1)
AUTHORS: Kolmogorov,A.N., and Tikhomirov,V.M. SOV/42-14-2-1/19

TITLE: The ε-Entropy and ε-Capacity of Sets in Functional Spaces

PERIODICAL: Uspekhi matematicheskikh nauk,1959,Vol 14,Nr 2,pp 3-86 (USSR)

ABSTRACT: The paper is a systematic representation of results obtained from 1954 to 1958 by K.I.Babenko, A.G.Vitushkin, V.D.Yerokhin, A.N.Kolmogorov, and V.M.Tikhomirov. After a short introduction there follows: §1. Definition and fundamental properties of the functions $H_\varepsilon(A)$ and $C_\varepsilon(A)$. §2. Examples of the rigorous calculation and the estimation of these functions. §3. Typical orders of increase of these functions. §4. The ε-entropy and ε-capacity in finite-dimensional spaces. §5. ε-entropy and ε-capacity for functions of finite smoothness. §6. ε-entropy of the class of differentiable functions in the metric L^2. §7. ε-entropy of classes of analytic functions. §8. ε-entropy of classes of analytic functions bounded on the real axis. §9. ε-entropy of the spaces of real functionals. Addition 1: Theorem of A.G.Vitushkin on the impossibility to represent a function of several variables by superpositions of functions of a smaller number of variables. Addition 2: Connection with the probability

Card 1/2

The ε-Entropy and ε-Capacity of Sets in Functional Spaces SOV/42-14-2-1/19

theoretical treatment of signal transmission.
In the text the authors mention V.I.Arnol'd, L.S.Pontryagin, L.G.Shnirl'man, N.S.Bakhvalov, I.M.Yaglom, and V.A.Kotel'nikov.
The paper contains 31 theorems, among them some unpublished results of V.I.Arnol'd and V.M.Tikhomirov.
There are 12 figures, and 29 references, 22 of which are Soviet, 1 German, 3 American, 1 Polish, and 2 Italian.

SUBMITTED: December 15, 1958

Card 2/2

ТИХОМИРОВ, В.М.

AUTHOR: TIKHOMIROV, V.M. 20-2--8/50

TITLE: On the ε - Entropy of Some Classes of Analytic Functions (Ob ε - Entropii nekotorykh klassov analiticheskikh funktsiy)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol.117, Nr 2, pp.191-194 (USSR)

ABSTRACT: Let F be a class of analytic functions $f(z)$, let Δ_T be the interval $-T \leqslant z \leqslant T$ of the real axis. The metric $\rho_T(f_1,f_2) = \max |f_1(z)-f_2(z)|$, $z \in \Delta_T$ is introduced. According to Kolmogorov [Ref.1] let $N_\varepsilon^T(F)$ be the minimum number of elements of an ε-covering of F. Let $\log_2 N_\varepsilon^T(F) = H_\varepsilon^T(F)$ denote the ε - entropy of the class F on the interval Δ_T. The following classes F are considered:

$A_h^T(M)$: the class of the analytic functions which are bounded by the constant M in the region G_h^T ($z = t+u$, $t \in \Delta_T$, $|u| < h$).

$F_{s,\sigma}^T(M)$: the class of the entire functions which satisfy the inequality $|f(t+u)| \leqslant M e^{\sigma|u|^s}$, $s \geqslant 1$ for every $t \in \Delta_T$ and every u.

$B_\sigma(M)$: the class of the entire functions which satisfy the re-

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lation $|f(z)| \leqslant M\, e^{\sigma |\mathrm{Im}\, z|}$.
The author applies the symbols $\sim$ and $\asymp$ for the denotation of the strong and weak equivalence.
Theorem 1:

$$\frac{2\sigma}{\pi} \log \frac{1}{\varepsilon} \sim \liminf_{T \to \infty} \frac{1}{2T} H_\varepsilon^T (B_\sigma(M)) \sim \limsup_{T \to \infty} \frac{1}{2T} H_\varepsilon{}^T(B_\sigma(M))$$

Theorem 2: It is uniformly in $T \geq 0$

$$H_\varepsilon{}^T(A_h{}^T(M)) \asymp \left(\frac{\log(1/\varepsilon)}{\log(\frac{1}{T}+1)} + 1 \right) \log \frac{1}{\varepsilon}$$

Theorem 3: For $s \geqslant 1$ it is uniformly in $T \geqslant 0$:

$$H_\varepsilon{}^T(F_{s,\sigma}{}^T(M)) \asymp \left(\frac{\log(1/\varepsilon)}{\log(\frac{\log(1/\varepsilon)^{1/\alpha}}{T}+1)} + 1 \right) \log \frac{1}{\varepsilon}$$

On the ϵ - Entropy of Some Classes of Analytic Functions 20-2-8/50

Several conclusions are formulated. 4 Soviet references are quoted.

ASSOCIATION: State University imeni M.V. Lomonosov, Moscow (Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova)

PRESENTED: By A.N. Kolmogorov, Academician, 17 May 1957

SUBMITTED: 17 May 1957

AVAILABLE: Library of Congress

Card 3/3

BULATOV, B.; TIKHOMIROV, V.N., red.; RAKITIN, I.T., tekhn. red.

[Brazil]Braziliia. Moskva, Izd-vo "Znanie," 1963. 47 p. (Novoe v zhizni, nauke, tekhnike. XII Seriia: Geologiia i geografiia, no.2) (MIRA 16:2)
(Brazil)

TIKHOMIROV, V. N.

USSR/Agriculture - Stock raising

Card 1/1 : Pub. 77 - 7/21

Authors : Tikhomirov, V. N.

Title : Stock raisers' town

Periodical : Nauka i zhizn' 21/9, 18-20, Sep 1954

Abstract : About one fourth of the area of the Agricultural Exposition at Moscow was devoted to a group of buildings housing stockraising exhibits. These, besides the animals themselves, comprised facilities for veterinary work, demonstrations of feeding methods and handling of animal products such as wool and milk. Illustrations.

Institution : .....

Submitted : .....

TIKHOMIROV, V.N.

KADEN, N.N.; TIKHOMIROV, V.N.

Morphology of the ovary and seeds of Umbelliferae. Biul. MOIP. Otd. biol. 59 no.3:79-83 My-Je '54. (MLRA 7:7)
(Umbelliferae) (Botany--Morphology)

Tikhomirov, V.N.

USSR/ Agriculture - Expositions

Card 1/1 : Pub. 86 - 6/39

Authors : Tikhomirov, V. N.

Title : Champions for year 1954 (at All-Union Agricultural Exposition)

Periodical : Priroda 44/3, 56 - 61, Mar 1955

Abstract : An account is given of the judging of stock at the agricultural fair at Moscow in 1954, at which 22 prize-winning animals were selected from a total of 800 head. Data are presented relating to some of the prize-winning animals, such as their origin, weight, figures for milk production for cows, special methods in breeding, etc. Illustrations.

Institution : .....

Submitted : .....

VOLKOV, A.A.; SHKUDOVA, R.I., metodist; TIKHOMIROV, V.N., otvetstvennyy redaktor; BABKINA, N.G., redaktor; PEVZNER, V.I., tekhnicheskiy redaktor

[Poultry breeding and pond fish culture" pavilion; a guidebook] Pavil'on "Ptitsevodstvo i prudovoe khoziaistvo"; putevoditel'. Moskva, Gos. izd-vo selkhoz. lit-ry, 1956. 27 p. (MLRA 9:12)

1. Moscow. Vsesoyuznaya sel'skokhozyaystvennaya vystavka, 1954-
2. Direktor pavil'ona (for Volkov)
(Poultry) (Fish culture)
(Moscow--Agricultural exhibitions)

TIKHOMIROV, V.N.; ROMANOVICH, Ye.F.; FEDOTOVA, A.F., tekhnicheskiy redaktor

[Stockbreeding at the All-Union Agricultural Exhibition of 1956] Zhivotnovodstvo na Vsesoiuznoi sel'skokhoziaistvennoi vystavke 1956 goda; putevoditel'. Moskva, Gos. izd-vo selkhoz. lit-ry, 1956. 435 p. (MLRA 10:1)

1. Moscow. Vsesoyuznaya sel'skokhozyaystvennaya vystavka, 1954- (Moscow--Livestock exhibitions)

TIKHOMIROV, V.N.

Grounds for the stock exhibition. Nauka i perед. op. v sel'khoz. 7 no.2:71-72 F '57. (MLRA 10:3)
(Livestock--Exhibitions)

TIKHOMIROV, V.N.; GALAKHOVA, O.N.

Materials on the morphology of the group Angelicinae. Report No.1. Study of the fruit anatomy of Angelica sylvestris L. as a lectotype of the genus Angelica L. Biul.MOIP.Otd.biol. 70 no.1:111-116 Ja-F '65. (MIRA 18:6)

TIKHOMIROV, V.N.

Some new views of the origin of flowering plants. Trudy MOIP. Otd. biol. 13:175-189 '65 (MIRA 19:1)

GIBADULIN, R.A.; BELOUSOV, L.V.; SHABADASH, A.L.; YEPIFANOVA, O.I.; CHERIVOVA, I.A.; ZALETAYEVA, T.A.; TIKHOMIROV, V.N.

Brief news. Biul. MOIP. Otd. biol. 69 no.1:145-156 Ja-F '64. (MIRA 17:4)

TIKHOMIROV, V. N.

"The origin and the general trends in the evolution of Apiaceae."

report submitted for 10th Intl Botanical Cong, Edinburgh, 3-12 Aug 64.

Moscow State Univ.

TIKHOMIROV, V.N.

Water caltrop (Trapa natans L. s. l.) in Moscow Province. Nauch. dokl. vys. shkoly; biol. nauki no.1:105-108 '64. (MIRA 17:4)

1. Rekomendovana kafedroy vysshikh rasteniy Moskovskogo gosudarstvennogo universiteta im. M.V.Lomonosova.

LACHINYAN, Leonid Artem'yevich; TIKHOMIROV, V.N., red.; KUDRYAVTSEVA, O.V., tekhn. red.

[In the depth of the earth]V glubiny Zemli. Moskva, Izd-vo "Znanie," 1963. 31 p. (Novoe v zhizni, nauke, tekhnike. XII Seriia: Geologiia i geografiia, no.1) (MIRA 16:1)
(Boring)

LACHINYAN, Leonid Artem'yevich; TIKHOMIROV, V.N., red.; KUDRYAVTSEVA, O.V., tekhn. red.

[In the depth of the earth]V glubiny Zemli. Moskva, Izd-vo "Znanie," 1963. 31 p. (Novoe v zhizni, nauke, tekhnike. XII Seriia: Geologiia i geografiia, no.1) (MIRA 16:1)
(Boring)

BOGOYAVLENSKIY, G.P.; TIKHOMIROV, V.N.; Prinimali uchastiye: SHISHKIN, I.B.; MAL'CHEVSKIY, G.N.; GALITSKIY, V.A.; BELEN'KIY, A.B., kand. ist. nauk, nauchnyy red.; GRIN, M.F., kand. ekon. nauk, nauchnyy red.; ZABELIN, I.M., kand. geogr. nauk; SAMSONENKO, L.V., nauchnyy red., FRADKIN, N.G., kand. geogr. nauk, nauchnyy red.; BELICHENKO, R.K., mladshiy red.; VILENSKAYA, E.N., tekhn. red.

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(Geography--Yearbooks)

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